Cloth Matching and Color Selection using Intelligent Robotic System

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Abstract - *This will help the people to select the apparel based on color. The robot automatically recognizes cloths color proposed. The image captured by the camera and gets processed to identify the color of the cloth. Recognized color is matched by intelligent system based on the decision. The system will pick the specific cloth based on recognized color by using robotic technology. The recognized colored cloth will be placed by the robot to the customer.*

Key Words: **Color recognition, intelligent system, picks and place arm, Image processing, Robotic Technology**

1. INTRODUCTION

Most of the people are worried about choosing matching cloths as per needed color from the textile shop. Salesman will need more time to find a suitable cloth of wanted color. So a lot of fabrics will have to be displayed to get the suitable one. Human eyes cannot continuously differentiate colors, as they get tired very soon. The aim of this system is to build a robot, which is capable of detecting colored cloths. It has a robotic arm, which, after detection of color, picks up the cloth and then place it at a predetermined place as required by the customer. In this system contains a camera along with the image processing software does the job of color detection. We have used several servomotors for rotating the arms of the robot. The arms can move horizontally from its base and vertically up and down. The gripper is capable of moving quite far for proper gripping of objects. The overall improvement in the efficiency of the production process can be significant by using this machine.

We matured a camera-based model to notice the clothing colors. The system integrates a camera &computer. The camera captures the image of cloth given by the customer. The image will send to computer .The computer identify the color of cloth by analyzing image captured. The camera captures the image of clothes from rack, having different colors and matches the clothes as per needed color and then robotic arm pick up that colored cloth from the rack. Although many methods have been developed for texture matching and color detection in the computer vision and image processing research, currently there is no device that can effectively supply matching choices for people. In this system, the clothes color is detected by color detection algorithm using openCV library and matching the clothes by contrast color given by the designer. Based on color recognition detecting color of cloths, then Arduino Uno controls the servo motor of robotic arm to pick up the cloth and then place it.

2. LITERATURE SURVEY

[1]This paper discussed about the development of an android mobile application for outfit coordination. This application could be used in shopping and home environments to help visually impaired individual to decide what items to purchase independently as well as to assist him to independently decide and not depend on any person. The proposed system matches the clothes and automatically moves to section and pick up the clothes said by the user and match according to code assigned by the designers and place it to the desired location.

[2] This paper depicts object recognition, object detection and tracking and its implementation on embedded platform. The implementation results show that the detection can accurately detect and trace sign boards in real time environment. With static camera various objects can be detected and tracked as long as the objects are in the line of sight of camera. But, with a rotating camera, multiple objects can be detected and any one object is processed.

[3] This paper proposed a Multi-DOF robotic sorter, which consists of a solid base and a moving arm with joints with different moving axes that can pick objects of different colors and place them at predefined locations according to their colors. Since this machine does not suffer from human fatigue, it can continuously perform the monotonous job of sorting without any mistake. This system will add accuracy and perfection in solving the problem of sorting industrial products. It will also reduce the labor cost hence reduce the production cost as well. As a result, companies will be able to supply products at a lower cost, which will be beneficial to both the producer and the consumer.

3. METHODOLOGY

In this system, the clothes color is detected by color detection algorithm using open CV library and matching the clothes by contrast color given by the designer. The camera captures the image of cloth and matches the cloth as per information given in the C++ code. Computer track the location of the cloth and the pick and place arm picks the cloth as per the instruction given by Arduino Uno.

The captured image is processed by image processing technique. The image of cloth is analyzed for various colors like Red, blue etc. The software is programmed to recognize these colors. Colors are detected and identified, for example the captured image has red color then red color is detected and Some 15 to 20 colors can be detected approximately. The detection of color depends on camera resolution and lighting

effects and after detection of cloth color, the cloths is picking up by the arm of the robot and places it into desired location.
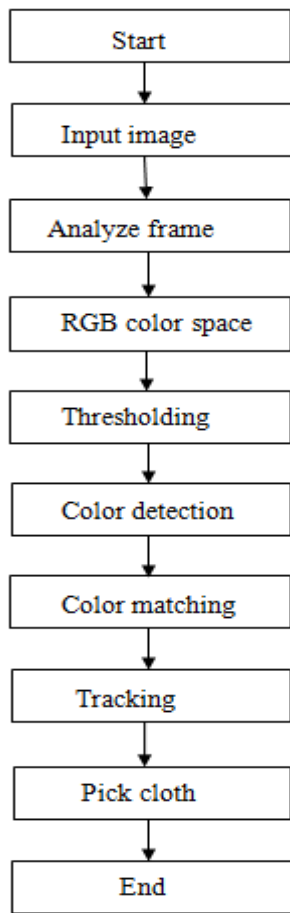

Fig-1: Flow Chart

3.1 Design

This system contains two parts, a pick and place arm and image processing. The pick and place arm contains servomotors and a camera. The Arduino Uno controls the movement of arm. A computer is used for image processing. A camera placed in front of the rack which contains the cloth. The customer shows the color of the cloth to the robotic system, the camera on the arm capture the image analyze the color from the frame using color thresholding. Second camera captures the picture and analyzes the colors which match with input color and track the position of the cloth where it placed in the rack. The computer passes the location to Arduino Uno, the Arduino Uno move the arm to pick the cloth from that position

Robotic Arm

A proper and stable structure is essential for carrying the total weight and operating smoothly. Proper design of this structure can efficiently conduct the total work.
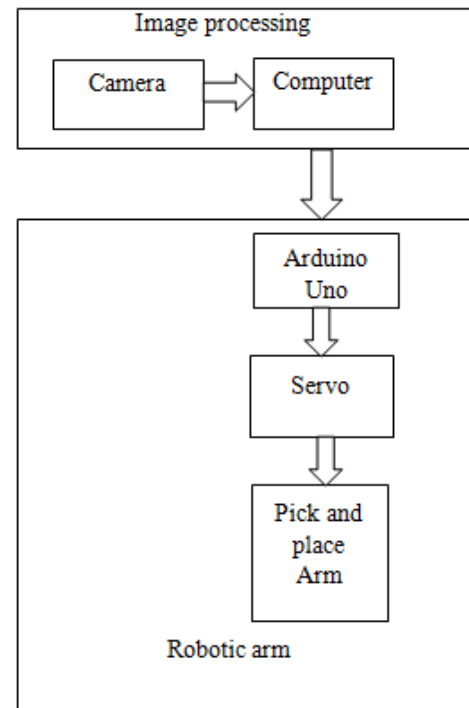

Fig-2: System Block Diagram

Servo Motor

Four servomotor are used for arm movement. A servomotor is a rotating actuator or linear actuator that takes into consideration exact control of angular or linear position, speed and acceleration. Servomotors are not a particular class of motors in spite of the fact that the term servomotor is regularly utilized to allude to a motor appropriate for use in closed-loop control system.

ArduinoUno

The Arduino Uno is a microcontroller board based on the ATmega328.The board used for programming the microcontroller in our prototype is Arduino Uno. It has 14 digital input/output pins of which 6 can be used as PWM outputs, 6 analog inputs, a 16 MHz ceramic resonator USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB to serial port converter. Revision 2 of the Uno board has a resistor pulling the 8U2 HWB line to ground, making it easier to put into DFU mode. Board has the following new features.1.0 pin out which added SDA and SCL pins that are near to the AREF pin and two other new pins placed near to the RESET pin, the IOREF that allow the shields to adapt to the voltage provided from the board.
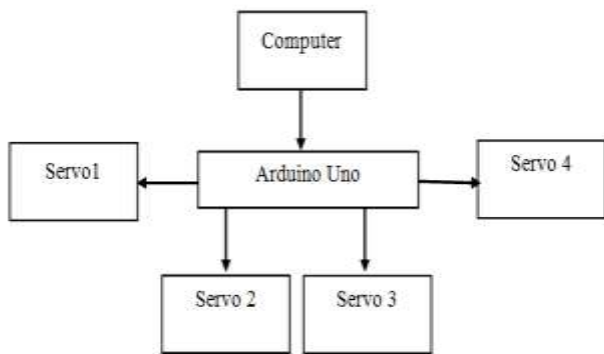
Fig-3: Block Diagram Of Robotic Arm

3.2 Image Processing

Digital image processing is the use of computer algorithms to perform image processing on digital images. Digital image processing has many advantages over analog image processing. It allows a much wider range of algorithm to be applied to the input data can avoid problems such as the buildup of noise and signal distortion during processing.

RGB Color Space

Because the human eye only has colour sensitive receptors for red, green and blue, it is theoretically possible to decompose every visible colour into combinations of these three "primary colours." Colour monitors, for instance, can display millions of colours simply by mixing different intensities of red, green and blue. It is most common to place the range of intensity for each colour on a scale from 0 to 255 (one byte). The range of intensity is also known as the "color depth".The possibilities for mixing the three primary colors together can be represented as a three dimensional coordinate plane with the values for R (red), G (green) and B (blue) on each axis. This coordinate plane yields a cube called the RGB color space.
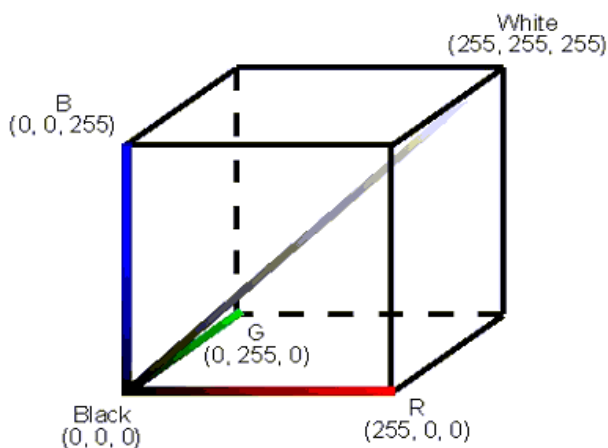
Color Detection

In this system, the clothes color is detected by color detection algorithm using openCV library and matching the clothes by contrast color given by the designer.The camera capture the image of the cloth, analyze the color from the input frame using color thresholding. Detect the color from the input image.

Color matching and tracking

A camera placed in front of the rack which contains the cloth. The customer shows the color of the cloth to the robotic system, then camera on the arm capture the image and analyzes the color from the frame using color thresholding. Second camera capture the picture and analyze the color .If it matches with input color then track the position of the cloth where it placed in the rack.
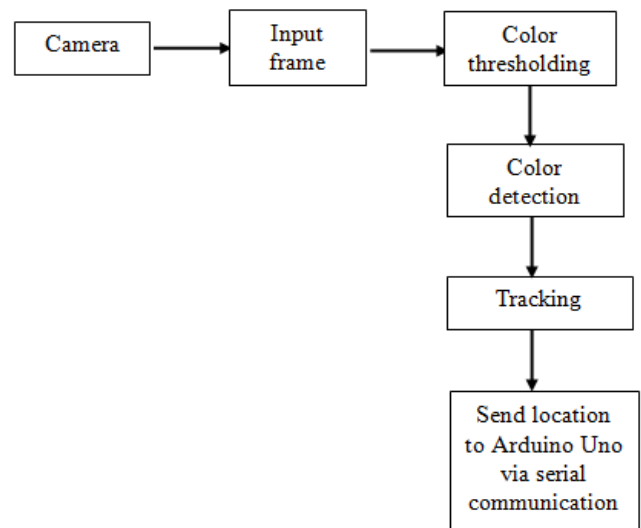

Fig-4: Image Processing

4. CONCLUSION

We have successfully designed a multi functioning robot, which consists of moving base and arm with joints with different moving axes that can pick up cloths of different colors. Since this machine does not suffer from human fatigue, it can continuously perform the job of picking cloth according to match of color without any mistake. This system will add accuracy and perfection in solving the problem of picking up matching cloth from rack in textile shop as per customer needs. It will reduce the time needed for selecting cloths from textile shop. It will also reduce the labor cost hence reduce the production cost as well. As a result, textile shop will be able to supply products at a lower cost, which will be beneficial to both the producer and the consumer.

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